CHAPTER 9
FIRE PROTECTION CRITERIA

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1. GENERAL. These fire protection criteria apply to new construction and major modifications and alterations to permanent, semi-permanent, and temporary buildings and facilities at Army installations, as well as to the equipment installed in these buildings and facilities.

2. CRITERIA.

a. General. Except as modified herein, designs will conform to MIL-HDBK 1008C (reference 9-1) and to the standards contained in the current National Fire Codes published by the National Fire Protection Association (NFPA) (reference 9-2). Advisory and recommended practices of the National Fire Codes are considered mandatory.

b. Deviation from these criteria. Where valid need exists and an alternate solution involving equivalent concepts and sound fire protection engineering are available, criteria deviation may be accepted after approval by HQUSACE/CEMP-E. Requests for approval must be endorsed by the cognizant USACE division engineering office, and must include justification, hazard analysis, cost comparison, criteria used, and other pertinent data. The granted approval will apply only to the specific request under consideration and not to similar projects. Where a standard or code allows an alternative arrangement subject to the approval of the authority having jurisdiction (AHJ), the AHJ for approving these alternative methods is HQUSACE/CEMP-E.

3. BUILDING CONSTRUCTION. Building construction criteria are listed in MIL-HDBK 1008C (reference 9-1). FRT plywood will not be used, except in nonstructural applications that are not subject to elevated temperatures or high humidity. FRT plywood will not be used in any part of the roof or roofing system.

4. EXITS AND MEANS OF EGRESS. All buildings and occupiable structures will comply with NFPA 101, Life Safety Code (reference 9-2).

5. INTERIOR FINISHES. Interior wall and ceiling finishes are the exposed interior surfaces of walls, movable partitions, and ceilings. Exposed insulation and acoustical materials applied to walls and ceilings will be considered as interior finish. Requirements for interior finish are listed in MIL-HDBK 1008C (reference 9-1). The following are interior finishes which are not specifically addressed by MIL-HDBK 1008C:

a. Prewired Workstations. Pre-wired workstation panels will have a flame spread rating of 25 or less and a smoke-developed rating of 150 or less.

b. Draperies and Upholstered Furniture. Draperies and upholstered furniture will conform to NFPA 101, Life Safety Code (reference 9-2). Since some manufacturers do not test for NFPA 260 and NFPA 261 (reference 9-2), the following tests are considered equivalent and can be used: California Technical Bulletin 116 (reference 9-7) is equivalent to NFPA 261; California Technical Bulletin 117 (reference 9-8) is equivalent to NFPA 260; California Technical Bulletin 133 (reference 9-9) exceeds NFPA 261 requirements.

6. SPECIAL OCCUPANCIES AND HAZARDS. Fire Protection requirements for special occupancies and hazards are addressed in MIL-HDBK 1008C (reference 9-1). The following are additional requirements:

a. Aircraft Hangars. ETL 1110-3-484 (reference 9-4) provides design guidance for protection of hangars containing fixed-wing aircraft. ETL 1110-3-485 (reference 9-5) provides design criteria for protection of helicopter hangars. A Technical Center of Expertise For Aircraft Hangar Fire Protection (TCX-FP) has been established at Transatlantic Programs Center, CETAC. The TCX-FP should be fully utilized to ensure adequacy, reliability, and cost effectiveness of the fire protection systems. Air Force (AF) criteria mandates reviews of each design stage of

AF aircraft hangar projects by the TCX. Procedures for submitting design submittals to the TCX-FP for review are detailed in ETL 1110-3-484 (reference 9-4).

b. Family Housing: Fire protection requirements are listed in TI 801-02, Army Family Housing (reference 9-3)

c. Aboveground Vertical Storage Tanks: New vertical tanks storing Class I flammable liquids, JP-5, JP-8, and diesel fuels for Navy shipboard readiness will be fixed-roof tanks with internal honeycomb metal floating pans. Pans will be non-perforated, closed-cell type conforming to the requirements of Standard Design 78-24-27, *Standard Fueling Systems, Aboveground Vertical Steel Tanks With Floating Pans and Fixed Roofs*. Fire protection requirements are as follows:

(1) AFFF fire extinguishing systems will not be required for fixed-roof tanks equipped with internal honeycomb floating pans. Combustible liquids, i.e. Class II and Class III liquids, other than JP-5, JP-8 and diesel fuels for shipboard readiness, will not require internal honeycomb floating pans or an AFFF fire extinguishing system.

(2) Tank separation and diking requirements will be in accordance with MIL-HDBK 1022 (reference 9-10).

7. FIRE EXTINGUISHING, ALARM, AND DETECTION SYSTEMS.

a. Halon Extinguishing Systems and Portable Extinguishers. Procurement of new halon fire extinguishing systems and halon portable extinguishers are no longer permitted. These systems and equipment will not be provided in Army facilities.

b. Automatic Sprinkler Systems. Sprinklers will be provided in those facilities in accordance with the MIL-HDBK 1008C (reference 9-1). Sprinklers will be used to offset construction cost for fire resistance ratings, fire separation, and travel distances to exits, whenever allowed by criteria. Because of low maintenance cost and high reliability, sprinkler protection should be provided by wet pipe systems. Dry pipe systems should be limited to areas subject to freezing. Pre-action sprinkler systems may be used in areas subject to freezing, but must be designed to be easily drained. Additional requirements for sprinkler systems are:

(1) Backflow Prevention. Criteria for cross-connection of water fire protection systems to potable water systems is the National Standard Plumbing Code (NSPC) (reference 9-6).

(2) Sprinkler systems will be supervised for water flow. Additionally, dry pipe systems will be supervised for low system air pressure. These supervisory signals will be monitored at a constantly attended location that would summon emergency response.

(3) All new sprinkler systems over 140 m^2 (1500 ft^2) should be hydraulically calculated.

(4) In buildings or areas requiring sprinkler protection, concealed spaces, such as suspended ceilings, will be sprinklered if they are to contain combustible construction or combustible materials.

(5) Water Flow Testing. Water flow test(s) will be conducted to determine available water supply for fire protection. The designer should perform or witness the required flow testing. Accepting historical water supply information or similar data without verification should be avoided. Test(s) will be conducted prior to the concept design submission.

(6) Hydraulic Calculations. The designer will provide hydraulic calculations demonstrating that the design will include an adequate water supply for fire protection. Hydraulic calculations will be submitted no later than the concept submission.

c. Carbon Dioxide Fire Extinguishing Systems. These systems will not be installed as total flooding systems in any occupiable space including mechanical and other equipment rooms. Local flooding systems will not be installed in spaces which can render the space hazardous to occupants if the system were to be discharged. Considerations must also be given to the location of system storage cylinders, tanks, and piping so that a failure in the equipment, such as a ruptured fitting, does not create a hazardous condition.

d. Fire Alarm Evacuation Systems. These systems consist primarily of manual pull stations and alarms indicating devices. Automatic alarm initiating devices such as detectors and water flow alarms will be connected to these systems when provided. These systems will be connected to a central alarm location, fire department, or alarm monitoring location. Wireless interior building fire alarm systems are not permitted in new construction.

(1) These systems will be independent systems and not be integrated with security, EMCS, or any other system, except for additional monitoring. Fire alarm systems may be connected to EMCS for operating of smoke control systems. Wiring will be installed in metallic tubing or conduit.

(2) Fire alarm evacuation systems will be provided in:

(a) All buildings required by NFPA 101, Life Safety Code (reference 9-2).

(b) All multi-story buildings with an occupant load of 20 persons or more above or below the level of exit discharge.

(c) All buildings with an occupant load of 100 persons or more.

(d) UOPH, UEPH, and similar sleeping facilities.

(e) All buildings requiring automatic detection systems.

(3) The fire alarm design will include location and specification of fire alarm notification devices as required to deliver the audible and visible notification levels required throughout the facility by NFPA 72, the National Fire Alarm Code (reference 9-2).

e. Fire Detection Systems.

(1) Fire detection systems will be provided in areas required by MIL-HDBK 1008C (reference 9-1) and should be limited to these applications. They include:

(a) All areas requiring fire detection by the NFPA standards and criteria contained herein.

(b) UEPH, UOPH, and other sleeping facilities.

(c) Family housing.

(d) Major electronic installations.

(2) Detection systems, especially smoke detection systems, require significant maintenance. It is critical that the required detectors are properly installed and maintained. Providing detectors in locations that are not required increases the already high maintenance costs of alarm systems and strains the maintenance program for critical detection systems. If a facility warrants protection and criteria do not require detection, protection should be accomplished by sprinkler protection, preferably wet pipe sprinklers which provides superior protection with very little maintenance.

8. REFERENCES.

9-1 Military Handbook (MIL-HDBK) 1008C, Fire Protection For Facilities Engineering, Design and Construction, 10 June 1997, Defense Printing Service, Standardization Document Order Desk, Building 4, Section D, 700 Robbins Avenue, Philadelphia, PA 19111-5094

9-2 National Fire Codes, Volumes 1 through 12, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269

9-3 Technical Instructions 801-02, Army Family Housing, Department of the Army, U.S. Army Corps of Engineers, Washington, DC 20314-1000

9-4 U.S. Army Corps of Engineers Engineering Technical Letter (ETL) 1110-3-484, Aircraft Hangar Fire Protection Systems, 26 September 1997

9-5 U.S. Army Corps of Engineers Engineering Technical Letter (ETL) 1110-3-485, Fire Protection For Hangars, 15 October 1997

9-6 National Standard Plumbing Code, National Association of Plumbing-Heating-Cooling Contractors, P.O. Box 6808, Fall Church, VA 22046

9-7 California Technical Bulletin 116, Test Procedure and Apparatus for Testing the Flame Retardance of Upholstered Furniture, State of California, Department of Consumer Affairs, Bureau of Home Furnishings and Thermal Insulation, 3485 Orange Grove Avenue, North Highlands, CA 95660-5595

9-8 California Technical Bulletin 117, Test Procedure and Apparatus for Testing the Flame Retardance of Resilient Filling Materials Used in Upholstered Furniture, State of California, Department of Consumer Affairs, Bureau of Home Furnishings and Thermal Insulation, 3485 Orange Grove Avenue, North Highlands, CA 95660-5595

9-9 California Technical Bulletin 133, Flammability Test Procedure for Seating Furniture for Use in Public Occupancies, State of California, Department of Consumer Affairs, Bureau of Home Furnishings and Thermal Insulation, 3485 Orange Grove Avenue, North Highlands, CA 95660-5595

9-10 Military Handbook (MIL-HDBK) 1022, Petroleum Fuel Facilities, 30 June 1997, Defense Printing Service, Standardization Document Order Desk, Building 4, Section D, 700 Robbins Avenue, Philadelphia, PA 19111-5094